

**REMARKS**

Claims 1, 2, 4 and 107-111 have been examined.

**I. Rejections under 35 U.S.C. § 102(b) in view of JP 2002-130589 to Sugiyama et al. (“Sugiyama”)**

The Examiner has rejected claims 1, 4, 107, 108 and 110 under 35 U.S.C. § 102(b) as allegedly being anticipated by Sugiyama.

**A. Claim 1**

Applicant submits that claim 1 is patentable over the cited reference. For example, claim 1 recites, “a grease supply system for supplying a grease to an inside of the rolling bearing; wherein the grease supply system supplies the grease such that a supply amount in one shot is set to 0.004 cc to 0.1 cc to prevent a temperature pulsation of the rolling bearing.”

The Examiner maintains that Sugiyama discloses the above features. Applicant submits, however, that Sugiyama is directed towards “oil” lubrication and is silent with regard to “grease” lubrication, much less temperature pulsation. Applicant notes that the translated Abstract of Sugiyama merely recites the term “lubricant.” Such term, on its own, is the result of an inaccurate translation of the original Japanese term. Applicant, whose first language is Japanese, submits that the term in question should have been translated as “lubricating oil.” The following is a translation of paragraph [0001] of Sugiyama:

[0001]

[Technical Field of Invention] The present invention relates to a spindle lubrication device which supplies lubricating oil to a spindle of various high-speed machines such as machine tools and, in particular, to a technique for distributing and supplying the lubricating oil to a plurality of spindles.

Applicant submits that Sugiyama only uses the term “lubricating oil” throughout its disclosure (see also translated specification as provided by JPO website).

While oil lubrication and grease lubrication may seem the same to a lay person, such lubrications form different types of lubricating methods to one of ordinary skill in the art. As an example, Applicant refers to Section 17 of the publication “Industrial Tribology: the Practical Aspects of Friction, Lubrication and Wear” by Mervin H. Jones, et al., a preview of which is provided by the Google Books website. A copy of the preview excerpt is attached as Appendix A.

While lubricating oil is generally supplied during use in oil lubricated systems, such as oil mist lubrication, oil air lubrication, jet lubrication, etc., it is not so common to supply grease during use in grease lubricated systems. This is because the grease provides its lubricating function for a long term with the initially enclosed amount. Therefore, grease lubrication is widely used due to its easy maintenance. However, when grease is used under a high-speed rotating condition, for example in recently increasing high-speed spindle units, grease deterioration is accelerated and may result in heat-seizure. While there have been some grease supplying lubrication methods, the present invention provides a grease lubrication with an ultralow-volume grease supply as defined in the claims, which is especially advantageous in

high-speed spindle units in which temperature pulsation is problematic. Sugiyama is completely silent with regard to these aspects of the claimed invention.

At least based on the foregoing, Applicant submits that claim 1 is patentable over the cited reference.

**B. Claims 4, 107 and 108**

Applicant submits that claims 4, 107 and 108 are patentable at least by virtue of their dependency upon claim 1.

**C. Claim 110**

Since claim 110 recites features that are analogous to the features of claim 1 discussed above, Applicant submits that claim 110 is patentable for at least analogous reasons as claim 1.

**II. Rejections under 35 U.S.C. § 103(a) in view of Sugiyama and Figures 113-121 and pages 1-11 of Applicant's specification ("AAPA")**

The Examiner has rejected claims 2, 107, 109 and 111 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sugiyama in view of the AAPA. Applicant submits that claims 2, 107, 109 and 111 are patentable at least by virtue of their dependency.

**III. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

**RESPONSE UNDER 37 C.F.R. § 1.111**  
U.S. Appln. No.: 10/522,669

Attorney Docket No.: Q85994

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: **December 2, 2010**

# Appendix A

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# Appendix A

## Explorer

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### 17.2 POINTS OF LUBRICATION

Bearings, the essential components of plant and machinery, may be generally grouped into journal, thrust, conveyor chain pin and link, anti-friction, slide-ways and crane rails. Each wear surface must be treated separately with regard to lubricant and lubrication technique.

The lubrication requirement of a plain journal bearing is the provision of an adequate and constant flow of lubricant of specified viscosity to give a fluid film of high-load bearing capacity. The journal bearing has inherently a convergence between the shaft and the bearing. When relative motion takes place a film of lubricant is induced between the surfaces, effectively separating them. Bearings employed to absorb thrust and prevent misalignment of shafts vary greatly in type and lubrication requirement, whilst anti-friction bearings require less lubricant than plain bearings. Most available formulae dealing with the application of grease to these bearings treat speed as an important factor. For small anti-friction bearings such as those employed in lightly loaded fractional horse-power motors, too much grease can be damaging. In such cases, recommended lubrication intervals of up to several years have been established. Chain pins and links present major critical wear points on floor and overhead (including Power and Free) conveyors. In the automobile industry, chain lengths of several hundred metres, having thousands of points requiring lubrication, are commonplace (Fig.1).

Slide-way and crane rail lubrication requires the right lubricant and the right applicator (see Fig.10, Section 17.6.1). Too little lubricant results in rapid wear; excessive lubricant can be a hazard to life or limb. Every case is different, yet in every case it is critical that the lubricant is applied in line with the requirements of that component, both with regard to mechanical wear and to energy conservancy.

### 17.3 SELECTING THE LUBRICANT - OIL OR GREASE?

In modern machinery lubrication, lubricants and the means of the application must be considered together.

The best lubricant will serve no useful purpose if it is not applied at the

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